

Global Biodiversity Informatics Outlook:

Delivering Biodiversity Knowledge in the Information Age



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Table of Contents

Introduction

Biodiversity conservation challenges.

What is Biodiversity Informatics?

Bioinformatics, biodiversity informatics, and ecoinformatics.

Quick History of BI

Manual → personal → institutional → national → global.

Some Global BI Initiatives

GBIF, BHL, and Encyclopedia of Life.

GBIO

A roadmap for BI.



Introduction

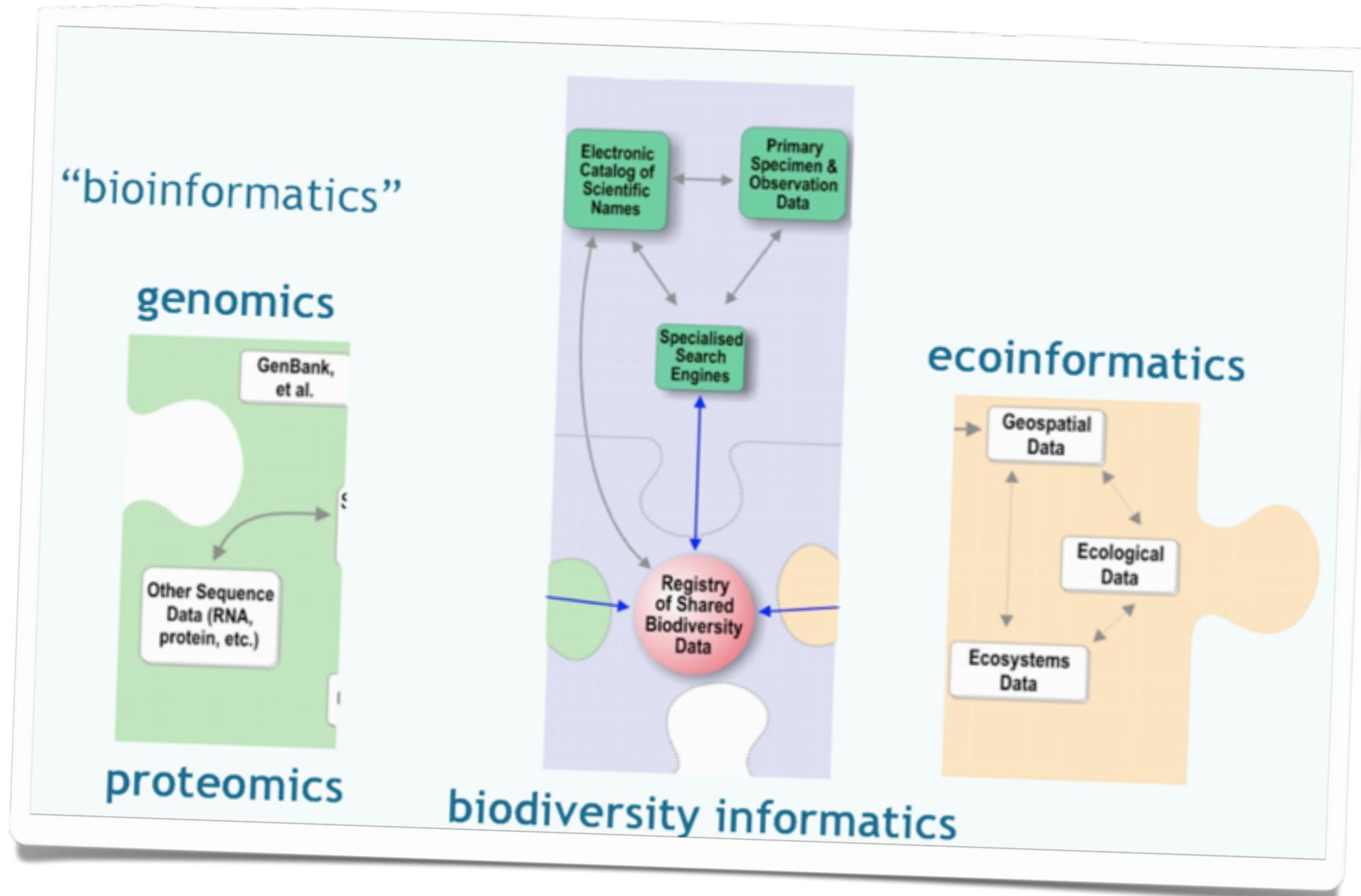
Biodiversity Conservation Challenges

<i>Dimension</i>	<i>Challenge</i>	<i>Who?</i>
Aesthetic	Enjoy and love it	Everybody
Diverse	Identify and classify	Taxonomists
Complex	Decipher & model	Biologists
Unknown	Discover & associate	Taxonomists
Endangered	Define & implement policies	Decision makers
Indispensable	Use sustainably	Everybody



What is Biodiversity Informatics?

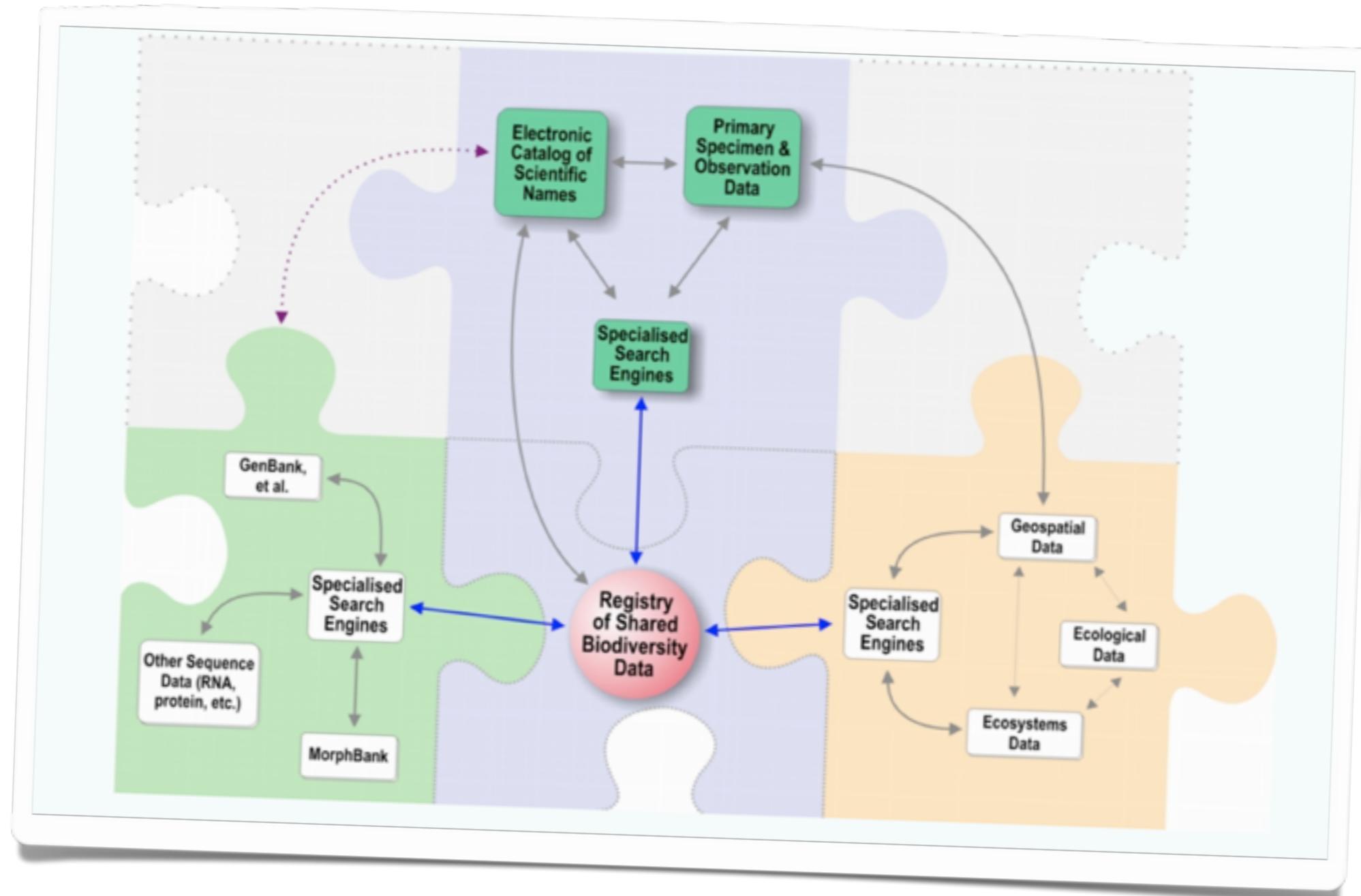
Bioinformatics, biodiversity informatics, and ecoinformatics





What is Biodiversity Informatics?

Bioinformatics, biodiversity informatics, and ecoinformatics





Quick History of BI

Manual → personal → institutional → national → global.

Typical phases in the development of Biodiversity Information Management Systems:

1. Manual processing
2. Personal databases
3. Institutional systems for one taxonomic group
4. Institutional systems for multiple taxonomic groups
5. Interinstitutional systems with centralized databases
6. Interinstitutional systems with distributed databases
7. Global knowledge management systems



Quick History of BI

Manual → personal → institutional → national → global.

Milestones:

1990: Big Bang (ERIN-Australia, INBio-Costa Rica, CONABIO-México)

1990-2000 National level initiatives

2000-2013 Global initiatives (GBIF, BHL, EOL, MapOfLife, iNaturalist)

2013-... Integration of information systems globally, nationally,
inter-institutionally



Some Global BI Initiatives

GBIF, BHL and Encyclopedia of Life

The screenshot shows the GBIF homepage with a green header featuring the GBIF logo and the text "Global Biodiversity Information Facility" and "Free and Open Access to Biodiversity Data". Below the header, there are four key statistics: 617,831,987 OCCURRENCES, 1,643,948 SPECIES, 29,032 DATASETS, and 809 DATA PUBLISHERS. The main content area includes sections on "Sharing biodiversity data for re-use", "Providing evidence for research and decisions", and "Collaborating as a global community". A search bar at the top right allows users to "Search news items and information pages...". Below the search bar, there's a "Latest GBIF news" section with a "FEATURED STORY" about surveying input on invasive alien species, accompanied by a small image of a plant. To the right, there are "LATEST NEWS" and "UPCOMING EVENTS" sections listing various meetings and workshops.

Global Biodiversity Information Facility

Free and Open Access to Biodiversity Data

617,831,987 OCCURRENCES | 1,643,948 SPECIES | 29,032 DATASETS | 809 DATA PUBLISHERS

Sharing biodiversity data for re-use

Providing evidence for research and decisions

Collaborating as a global community

Search news items and information pages... Search

Latest GBIF news

FEATURED STORY

Survey seeks input on using and publishing data on invasive alien species

LATEST NEWS

September 1st, 2016 Survey seeks input on using and publishing data on invasive alien species

August 18th, 2016 Licensing milestone for data access in GBIF.org

August 3rd, 2016 Caribbean surveys seek input on biodiversity data needs and resources

July 29th, 2016 2016 GBIF Ebbe Nielsen Challenge targets data gaps and biases

More

Go to GBIF Newsroom

UPCOMING EVENTS

SEP 06 2016 GBIF Asia Training Workshop on Biodiversity Informatics Chinese Taipei

SEP 07 Kick-off meeting with National Biodiversity Data Holders Lomé, Togo

OCT 11 IMDIS 2016 Gdańsk, Poland

OCT 24 GB23: 23rd meeting of the GBIF Governing Board Brasília, Brazil

More

GBIF

- Founded in 2001.
- Vision: Open and free access to biodiversity data.
- Type of information: primary data about occurrences (specimens & observations)
- # of records: 617 million
- # of images: 11 million
- # of audios: ~70,000
- # of species: 1.6 million
- # of data providers: 809
- # of datasets: 29,032
- www.gbif.org



Some Global BI Initiatives

GBIF, BHL and Encyclopedia of Life

The screenshot shows the BHL homepage. At the top, there's a navigation bar with links for 'About', 'Help', and 'Feedback'. Below it, social media icons show 4.3K likes on Facebook and 1.1K tweets on Twitter. A main banner features a blue bird with a red beak perched on a branch, with the text 'Inspiring discovery through free access to biodiversity knowledge.' and 'The Biodiversity Heritage Library improves research methodology by collaboratively making biodiversity literature openly available to the world as part of a global biodiversity community.' It also mentions that BHL serves as the foundational literature component of the Encyclopedia of Life. Below the banner is a search bar and a 'Advanced Search' link. To the right is a 'Help Support BHL' section with a 'Donate Now' button. On the left, there's a sidebar with 'New on the BHL Blog' (listing 'Catesby's Magnificent Natural History, In Three Editions' and 'IFLA Presentation on Expanding Access to Natural History Illustrations'), a 'Featured Content BHL at 10' section with a 'BHL@10' logo and '#BHLat10' tag, and social media links for 'Stay Connected' (Facebook, Twitter, YouTube), 'BHL on Twitter', and 'Now Online'.

BHL

- Founded in 2005.
- Vision: Inspiring discovery through free access to biodiversity knowledge.
- Type of information: legacy literature of biodiversity
- # of pages: 50 million
- # of volumes: ~186,000
- www.biodiversitylibrary.org



Some Global BI Initiatives

GBIF, BHL and Encyclopedia of Life

The screenshot shows the EOL homepage with a dark header featuring the EOL logo and a profile picture for 'Erick'. Below the header is a banner with the text 'Global access to knowledge about life on Earth' and a search bar. A row of five images shows various species: a plant, a fly, a flower, a shell, and a moth. The main content area includes news items like 'Nature for All' and 'World Oceans Day', and a 'Community Activity' section showing recent interactions from users like C. Michael Hogan and James Rosindell.

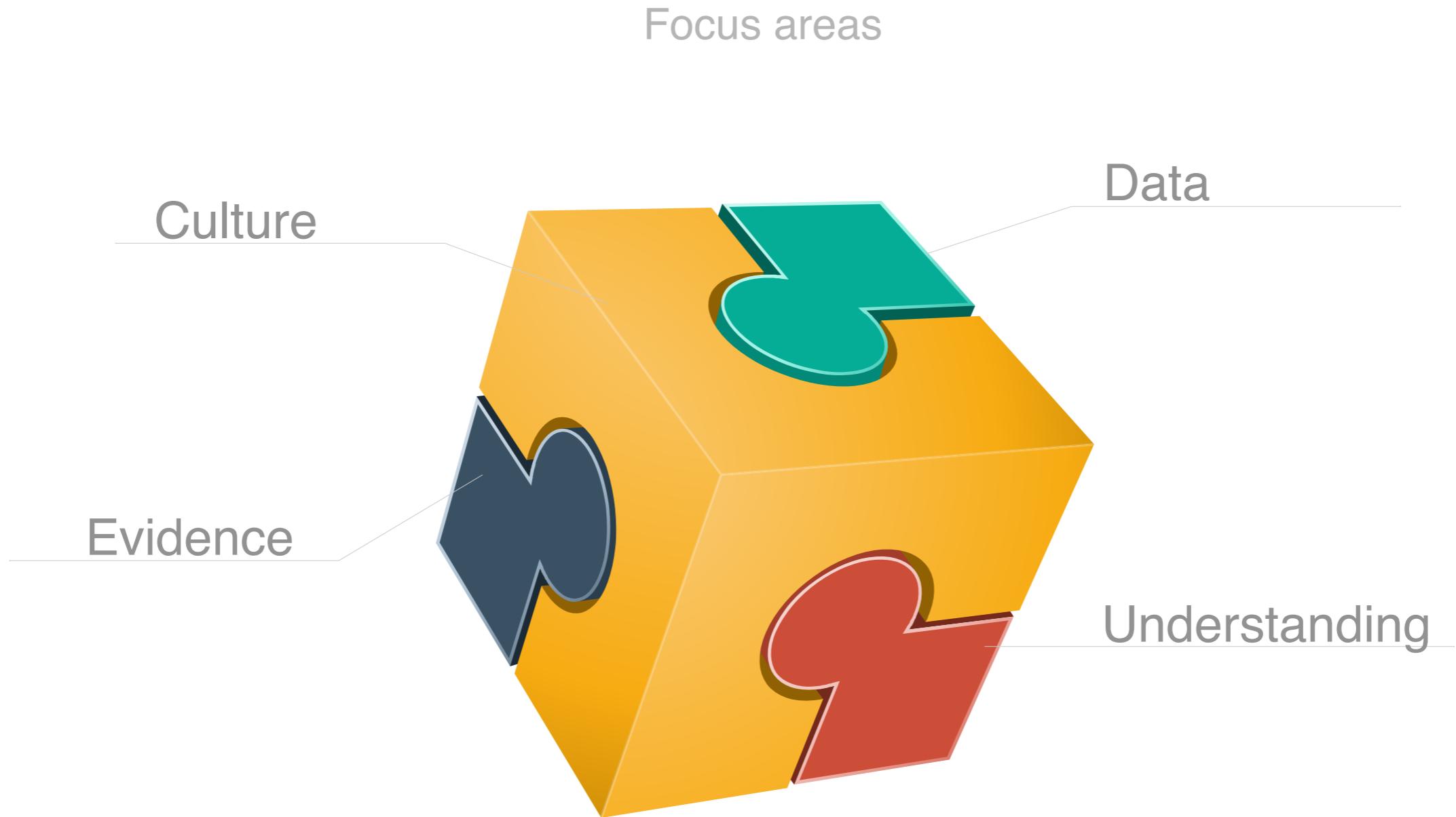
EOL

- Founded in 2008.
- Vision: Global access to knowledge about life on Earth.
- Type of information: species descriptions
- # of records: 1.3 million
- # of traits: ~11 million
- # of images: ~4 million
- # of collections: ~10,000
- # of registered members: 88,074
- # content partners: 356
- # of datasets: 29,032
- www.eol.org



Global Biodiversity Informatics Outlook

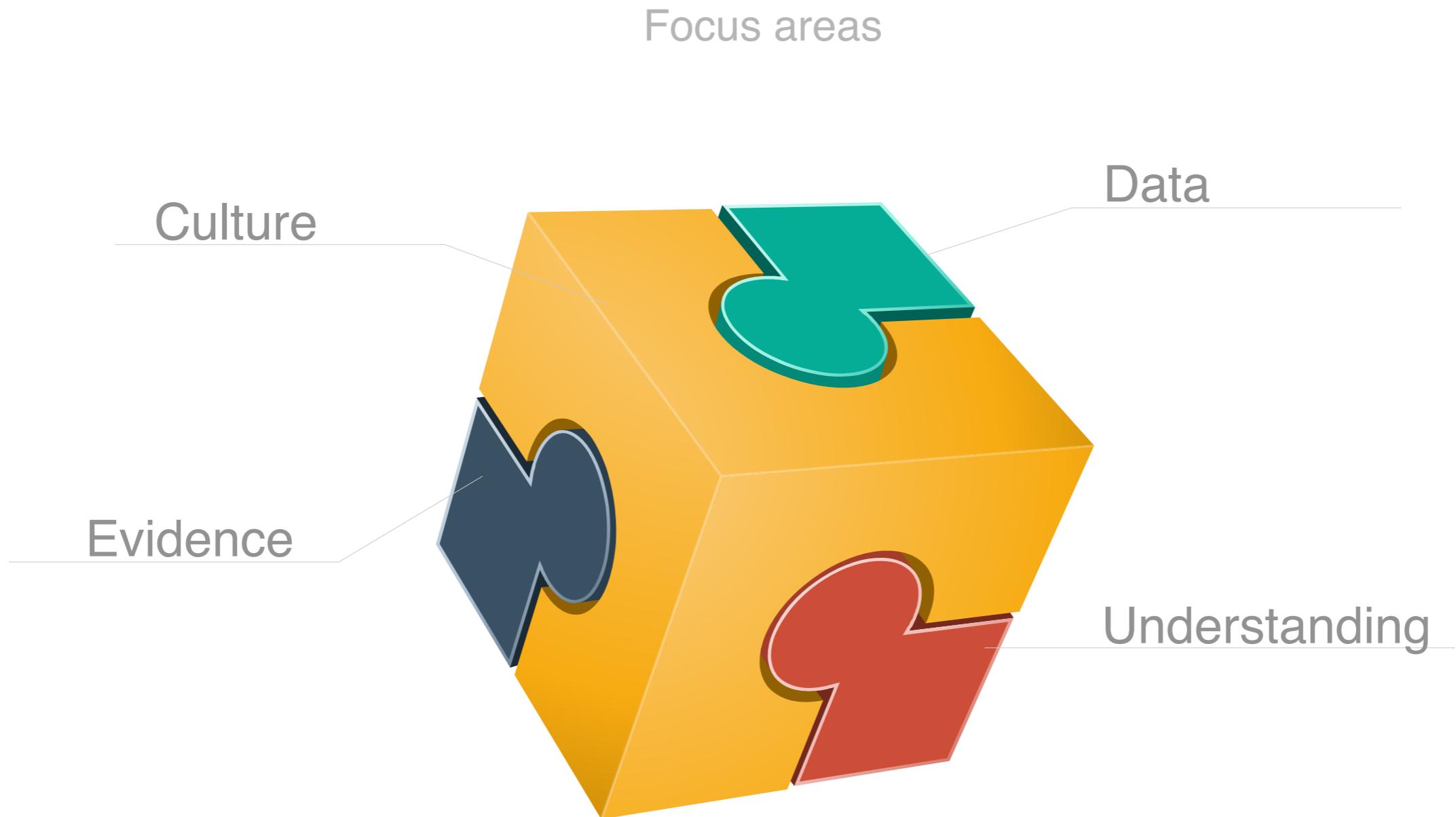
A Roadmap for BI





Global Biodiversity Informatics Outlook

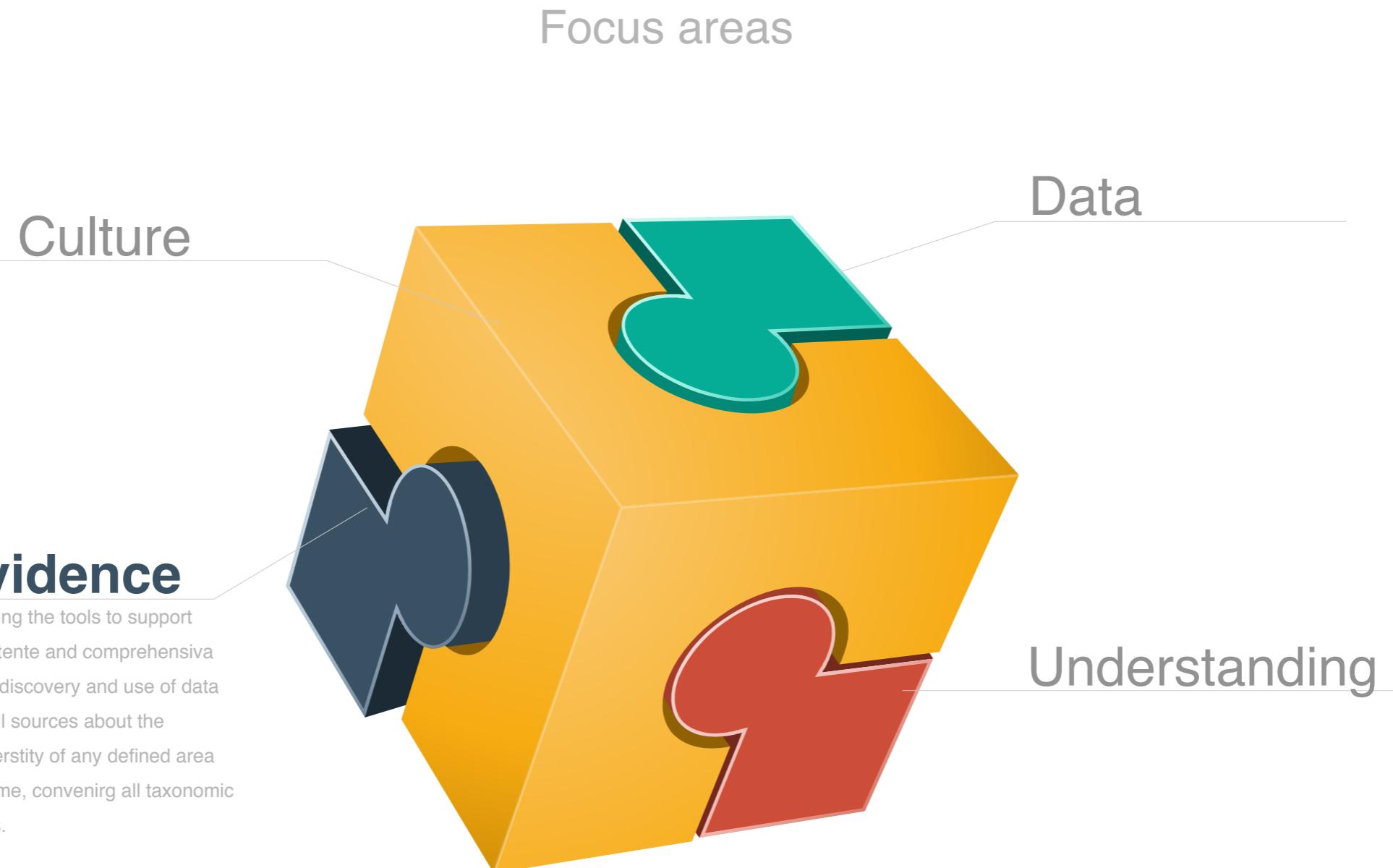
A Roadmap for BI





Global Biodiversity Informatics Outlook

A Roadmap for BI





Global Biodiversity Informatics Outlook

A Roadmap for BI

Focus areas

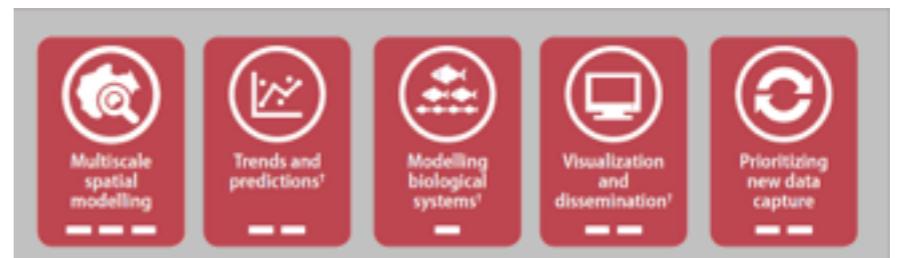
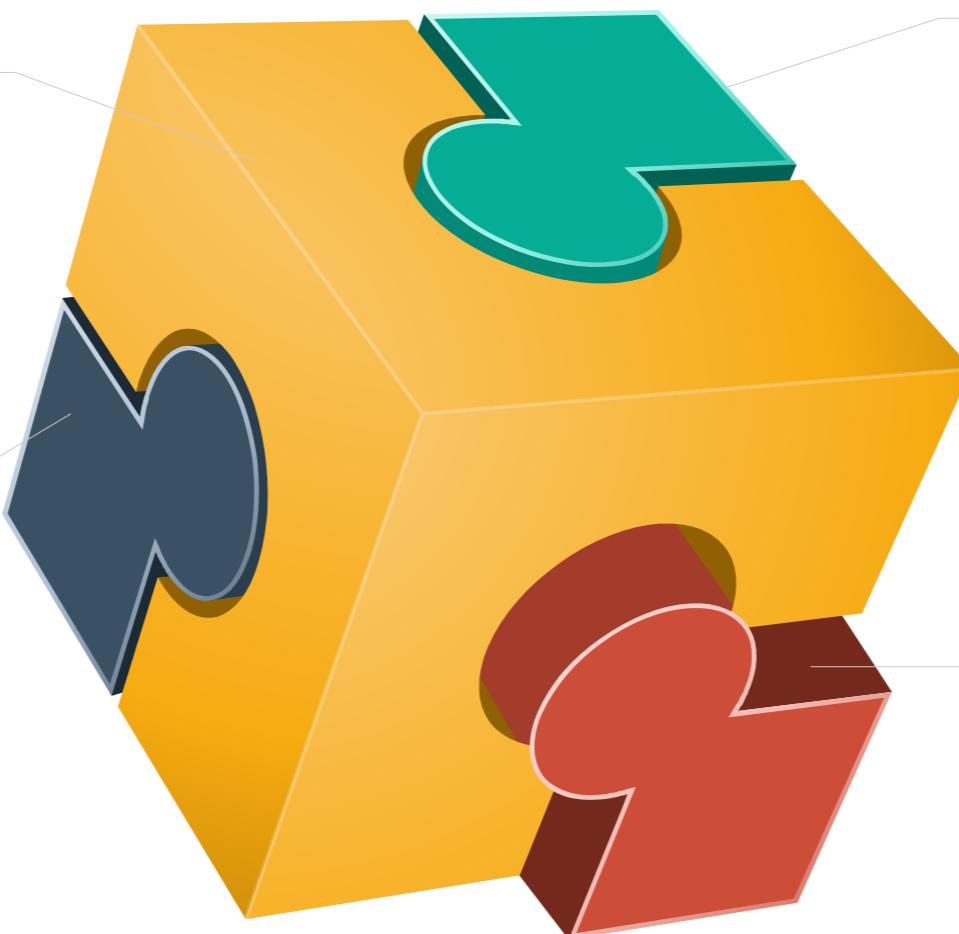
Culture

Evidence

Data

Understanding

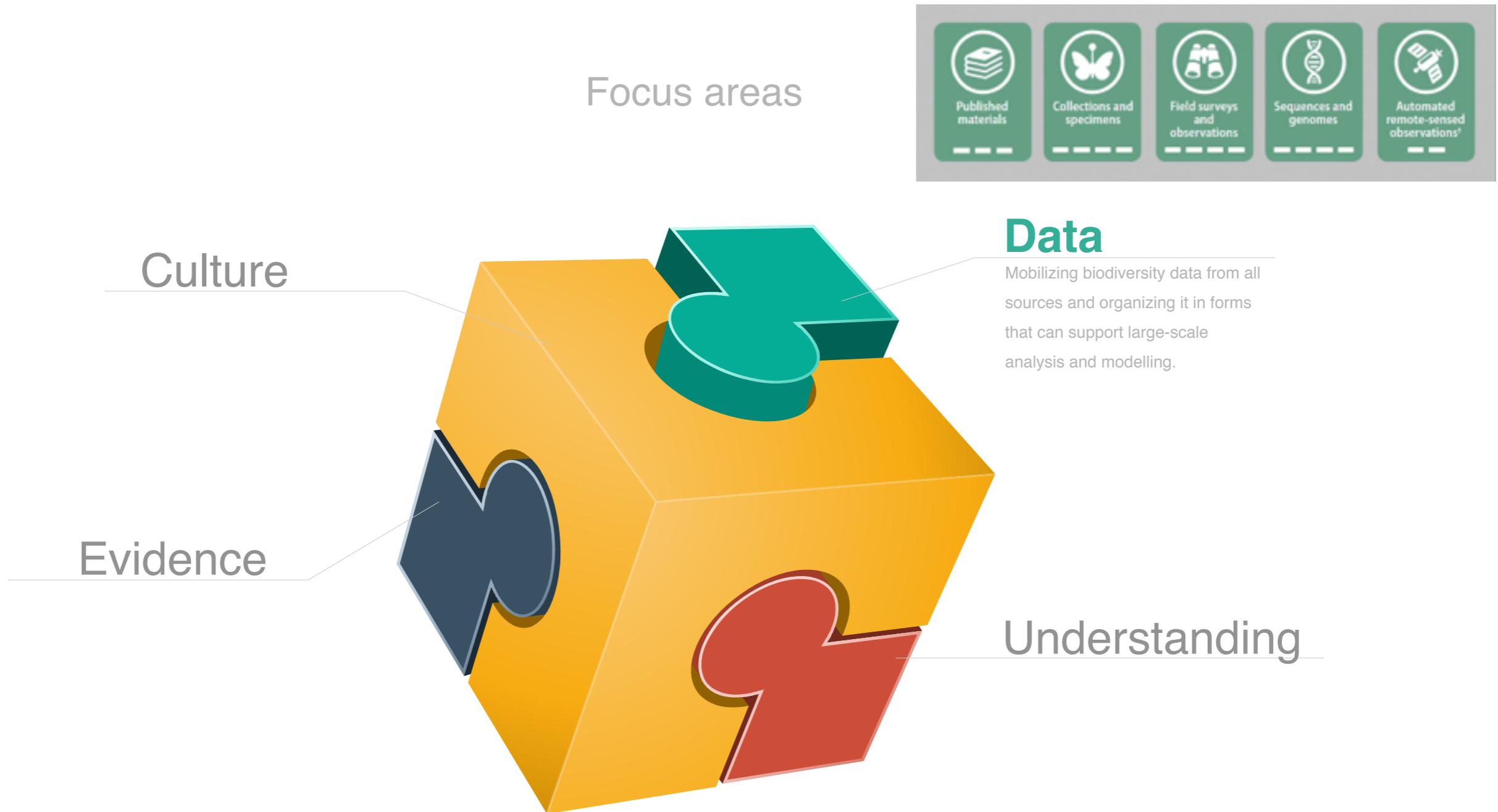
Using the combined biodiversity data from multiple sources to generate new information, and help educate wider society to improve the way we manage Earth's resources.





Global Biodiversity Informatics Outlook

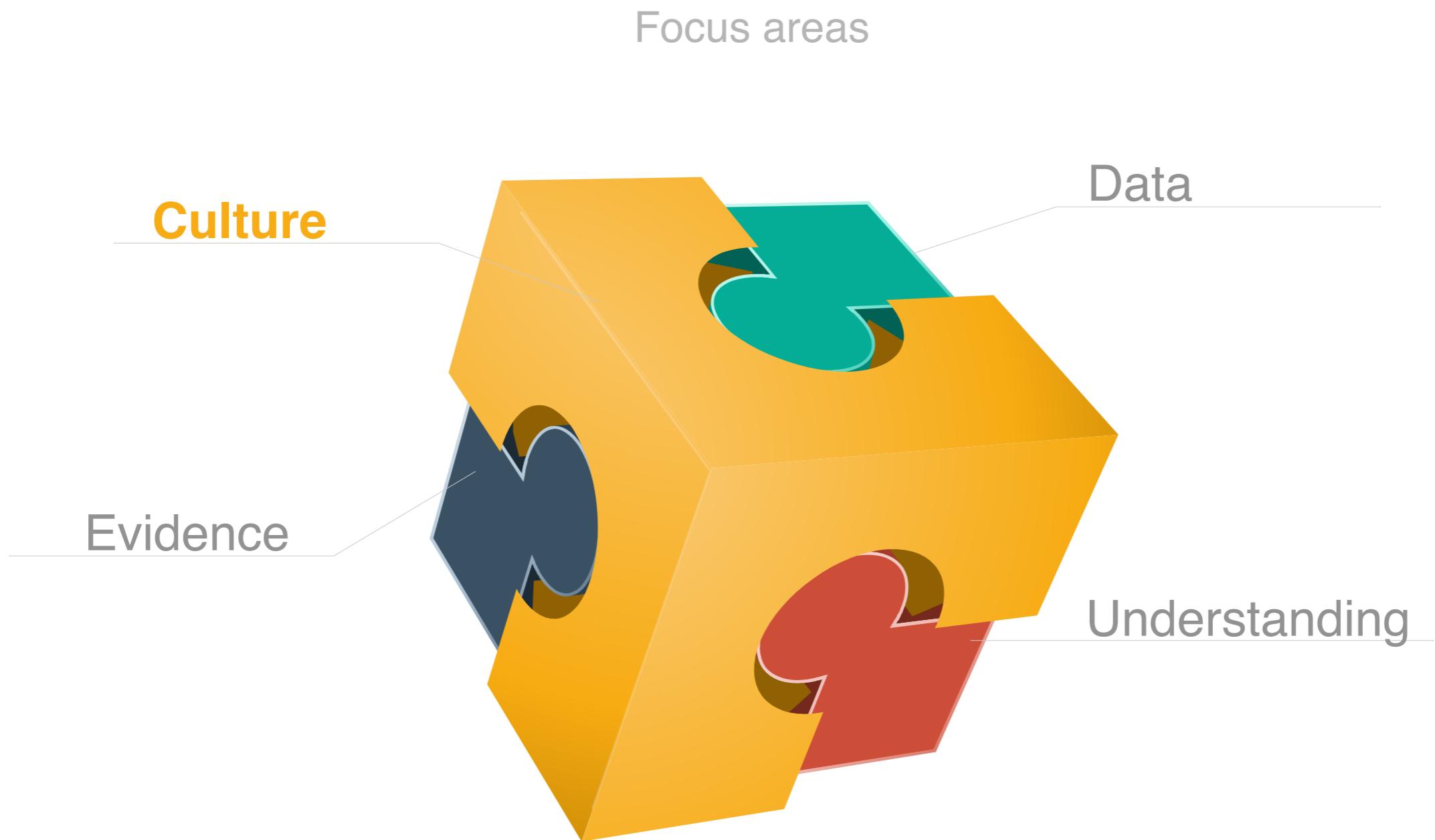
A Roadmap for BI





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A Roadmap for BI





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A Roadmap for BI

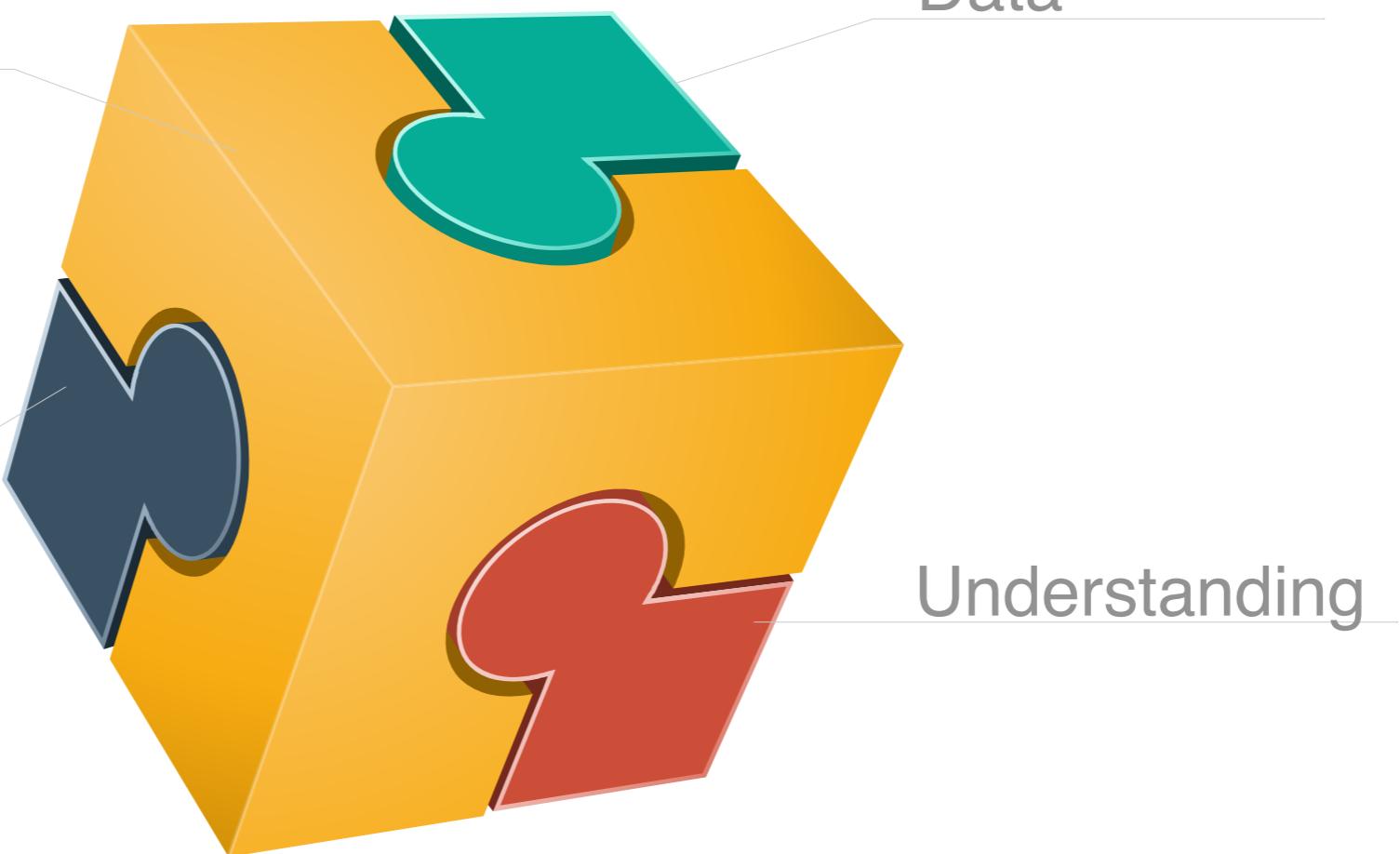


Focus areas

Culture

Putting the foundations in place to make biodiversity data an openly shared, freely available, connected resource.

Evidence



Understanding

Data



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A Roadmap for BI



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Conclusions

- BI has achieved important goals at the CULTURE and DATA level.
- First 15 years dominated by developing databases, quality control, data sharing standards development.
- Large global data bases and tech developments make BI more attractive to computer scientists:
 - Image/sound/video-based organismal identification (at different taxonomic levels).
 - Develop larger image datasets vía crowdsourcing and “rejuvenating” sheets from herbaria.
 - Find *ecosistem signatures* to identify them in satellite images.
 - Visualization of taxonomies: static analysis & dynamic analysis